UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/512,095	10/21/2004	Hag-Yong Kim	3254-0124PUS1	9155

2292 7590 02/27/2007
BIRCH STEWART KOLASCH & BIRCH
PO BOX 747
FALLS CHURCH, VA 22040-0747

EXAMINER	
BUTLER, PATRICK	
ART UNIT	PAPER NUMBER
1732	

SHORTENED STATUTORY PERIOD OF RESPONSE	NOTIFICATION DATE	DELIVERY MODE
3 MONTHS	02/27/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Notice of this Office communication was sent electronically on the above-indicated "Notification Date" and has a shortened statutory period for reply of 3 MONTHS from 02/27/2007.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

Office Action Summary	Application No.	Applicant(s)	
	10/512,095	KIM ET AL.	
	Examiner	Art Unit	
	Patrick Butler	1732	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 November 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-10* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *21 October 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-6 and 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al (20020100725) in view of Terry et al (2746839).

Regarding claims 1, Lee et al teach a process of preparing a continuous filament composed of a nano fiber (par 0008), wherein nano fibers are prepared by spinning one or more polymer (par 0040) spinning dope through a spinneret (nozzle) onto the surface of a collector, has a conductive material (par 0042) with a high voltage applied through nozzles with a high voltage applied (par 0059). Lee et al also teach rolling up the web of fiber using a roller (par 0055). However, Lee et al do not teach spinning the fibers

onto the surface of water or organic solvent of a collector where the fibers are pressed, drawn, dried and wound while being pulled by a rotary roller rotating at a constant linear velocity from the location spaced more than 1 cm from one end of a dropping spot.

Nevertheless, Terry et al teach pressing and drawing the fibers through the spinning head (fig 1, **24**), drawing the fibers through a coagulating bath (fig 1, **55**) containing organic solvent (col. 6 lines 41-44), drying and winding the fibers by a rotary roller (fig 1, **66,67,72**) rotating at a constant linear velocity from (col. 7 lines 23-25). Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to use the teachings of Terry et al in Lee et al's electrospinning method in order to dissolve out the solvents from the plastic material being spun (col.6 lines 36-40). The distance of the rotary roller to the end of a dropping spot is considered to be a control variable. The examiner notes that discovering the optimum value of a result effective variable involves only routine skill in the art. "In re Boesch," 617F.2d 272,205 USPQ215 (CCPA1980).

Regarding claim 2, Lee et al teach that the conductive material is a metal/aluminum plate (par 0059).

Regarding claims 3 and 4, Lee et al do not teach that the distance from the surface of water or organic solvent contained in the collector to the top surface of the conductive material is 0.01 to 200 nm or 5 to 50 nm. However, the distance from the surface of the solvent to the top surface of the conductive material is a control variable. Examiner notes that discovering the optimum value of a result effective variable

involves only routine skill in the art. "In re Boesch," 617F.2d 272,205 USPQ215 (CCPA 1980).

Regarding claims 5 and 6, Lee et al do not teach the angles being 0 to 180° or 10 to 90°. However, Terry et al teach the angle of the filament to the roller **66** as being approximately 45° (fig 1). Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to use the teachings of Terry et al in Lee et al's electrospinning method in order to remove free liquid (col.7 line 18).

Regarding claim 8, Lee et al teach nano fibers having a diameter less than 1,000 nm (par 0009).

Regarding claim 9, Lee et al teach electrospinning nylon (par 0009).

Regarding claim 10, Lee teaches nano fibers are prepared by spinning one or more polymer (par 0040) through respective barrels to prepare more than one type of polymer fiber (par 0040).

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al (20020100725) in view of Terry et al (2746839) further in view of Reneker (6520425). Lee et al in view of Terry et al do not teach twisted filament (yarn). However Reneker teach combined nanofibers that are twisted into yarns with a gas vortex (col. 12 lines 28-29). Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to use the teachings of Reneker in Lee et al's method of electrospinning in order to form twisted yarn that could be woven into a fabric.

Response to Arguments

Applicant's arguments filed15 August 2006 and 21 November 2006 have been fully considered but they are not persuasive.

Applicant argues with respect to the 35 USC §103 rejections. Applicant's arguments appear to be on the grounds that:

1) Hindsight was use for constructing the rejection of Lee in view of Terry.

2) Terry does not teach spinning the fibers onto the surface of water or organic solvent as the collector.

3) The collector utilized in Lee is not water or an organic solvent but rather a cumulation plate that is placed on a conductive collector in order to accumulate the polymer web material.

4) Lee's cumulation plate and conductive collector are in juxtaposition with respect to each other rather than the claimed distance between the two of 0.01—200 mm between the organic solvent and the conductive surface.

5) Lee does not show that the fibers are caught, pressed, drawn, dried, and wound by a roller.

6) The distance from one end of the dropping spot of the nano fibers to the initial point where the nano fibers are pulled by the rotary roller is more than 1 cm is not recognized.

7) There's no recognition in Lee that the conductive material can be a metal plate or metal powder disposed at a distance from the surface of the water or organic solvent of 0.01 to 200 nm or preferably 5 to 50 nm. The distance is critical because if it is too large, the voltage applied to the conductive material is not transferred well to the surface

of the water or organic solvent, thereby making the collective state of the nano fiber very poor.

8) Terry is unrelated to the process of manufacturing nano fibers utilizing voltage applied to spinning nozzles and collector surfaces since it is a common type of spinning of merely spinning into a coagulating bath. Thus, there is no reason to combine Terry with Lee.

9) The references relied upon do not suggest or teach the distance from the surface of the water or organic solvent to the top of the surface of the conductive material.

10) The references relied upon do not suggest or teach the distance from one end of the dropping spot of the nano fibers to the initial point where the nano fibers are pulled by the rotary roller.

11) The references relied upon do not suggest or teach the angle formed between the nanofibers collected on the surface of the water or organic solvent in the undrawn filament.

The Applicant's arguments are addressed as follows:

1) In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a

reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

2) Terry's interface between the nozzle and the organic solvent is the surface spun onto (see fig. 1, ref. no. 24 and 55) where it is collected by the rollers 66, 67, 72.

3) Terry is relied upon for the teaching of organic solvent rather than Lee.

4) Lee in view of Terry as combined would have solvent with conductive material below the surface, which matched Applicant's claim of having the surface of the solvent above the conductive material.

5) Terry teaches catching the yarn, pressing, drawing, drying, and winding as previously described:

> Terry et al teach pressing and drawing the fibers through the spinning head (fig 1, **24**), drawing the fibers through a coagulating bath (fig 1, **55**) containing organic solvent (col.6 lines 41-44), drying and winding the fibers by a rotary roller (fig 1, **66,67,72**) rotating at a constant linear velocity from (col. 7 lines 23-25).

6 and 10) The distance is addressed as previously described:

> The distance of the rotary roller to the end of a dropping spot is considered to be a control variable. The examiner notes that discovering the optimum value of a result effective variable involves only routine skill in the art. "In re Boesch," 617F.2d 272,205 USPQ215 (CCPA1980).

7 and 9) The distance is addressed as previously described:

Lee et al do not teach that the distance from the surface of water or organic solvent contained in the collector to the top surface of the conductive material is 0.01 to 200 nm or 5 to 50 nm. However, the distance from the surface of the solvent to the top surface of the conductive material is a control variable. Examiner notes that discovering the optimum value of a result effective variable involves only routine skill in the art. "In re Boesch," 617F.2d 272,205 USPQ215 (CCPA 1980).

7) Moreover, concerning the results of improper distance, the arguments of counsel cannot take the place of evidence in the record.

8) The motivation to combine the references, as previously cited, is to combine is to dissolve out the solvents from the plastic material being spun (col. 6, lines 36-40).

11) The angle is addressed as previously described:

Lee et al do not teach the angles being 0 to 180° or 10 to 90°. However, Terry et al teach the angle of the filament to the roller **66** as being approximately 45° (fig 1). Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to use the teachings of Terry et al in Lee et al's electrospinning method in order to remove free liquid (col.7 line 18).

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Patrick Butler whose telephone number is (571) 272-8517. The examiner can normally be reached on Mo.-Th. 7:30 a.m. - 5 p.m. and alternating Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christina Johnson can be reached on (571) 272-1176. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Patrick Butler
Assistant Examiner
Art Unit 1732

CHRISTINA JOHNSON
SUPERVISORY PATENT EXAMINER
2/10/07